

## **REMARKS**

In view of the above amendments and the following remarks, reconsideration of the rejections and further examination are requested. Upon entry of this amendment, claims 20, 24, 31 and 32 are amended, and claims 21 and 30 are cancelled, leaving claims 20, 24-27 and 31-33 pending with claim 20 being independent. No new matter has been added.

### ***Rejections Under 35 U.S.C. §103(a)***

Claims 20, 21, 24-27, 30, 31 and 33 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Lahaug (U.S. 6,338,938) in view of Mimura et al. (U.S. 7,022,616) and McReynolds (U.S. 6,191,043).

Applicants submit that the claims as now pending are allowable over the cited prior art. Specifically, amended independent claim 20 recites a plasma etching method of performing plasma etching to a silicon-on-insulator (SOI) substrate in a treatment chamber, the plasma etching method comprising introducing, into the treatment chamber, an etching gas which includes a fluorine compound gas and a rare gas, and energizing the etching gas into a plasma state by supplying electricity to the etching gas, the electricity having a frequency that is equal to or more than 27 MHz, wherein a volumetric flow rate of the helium (He) gas introduced into the treatment chamber is equal to or more than 80% of a total volumetric flow rate of the etching gas, and wherein the fluorine compound gas is sulfur hexafluoride (SF<sub>6</sub>) gas, and wherein the etching gas does not contain oxygen (O<sub>2</sub>) gas and further includes polymer forming gas.

The etching gas recited in claim 20 of this application, i.e., an etching gas including a polymer forming gas, is useful for etching of SOI substrates to suppress side etching.

The cited prior art fails to disclose or render obvious such a method. In particular, Lahaug discloses an etching gas which contains SF<sub>6</sub> gas as fluorine compound gas and also He gas but does not contain O<sub>2</sub> gas. *See* column 31 lines 48-50 of Lahaug. Mimura discloses that power having a frequency of 27 MHz is preferably applied to energize an etching gas into a plasma state in terms of etching speed, and etching rate and selectivity. *See* column 8 lines 21-24 of Mimura. McReynolds shows, in Table 2, that He flow is 80% or more. In light of these references, the Examiner has determined that the combination of Lahaug, Mimura, and McReynolds renders independent claim 20 of the present application obvious.

Applicants respectfully disagree and submit that none of these cited references discloses

that the etching gas further includes polymer forming gas to etch SOI substrates, as recited in independent claim 20. In the rejection of dependent claims 30 and 31, the Examiner has stated that one of ordinary skill in the art would have combined Lahaug with Mimura to add polymer forming gas to etching gas. However, as the Examiner has recognized, McReynolds merely discloses that C<sub>4</sub>F<sub>8</sub> gas and CHF<sub>3</sub> gas (polymer forming gases) are used instead of SF<sub>6</sub> gas (fluorine compound gas). *See* column 5 lines 17-20 of McReynolds. Therefore, McReynolds fails to disclose an etching gas that includes both a fluorine compound gas and a polymer forming gas. Moreover, McReynolds does not disclose that the gases are suitable for etching SOI substrates.

Further, there is no reasoning in the prior art to modify Lahaug, Mimura, or McReynolds such that combination thereof would have rendered independent claim 20 obvious. Therefore, Applicants submit that independent claim 20 and its dependent claims are allowable over the cited prior art.

Claim 32 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Lahaug in view of Mimura and McReynolds as applied to claims 20, 21, 24-27, 30 and 31, above and further in view of Okumura (U.S. 2003/0034542).

Applicants submit that since claim 32 is dependent from claim 20, and since Okumura fails to overcome the deficiencies of the combination of Lahaug, Mimura, and McReynolds, claim 32 is allowable over the cited prior art.

### ***Conclusion***

In view of the foregoing amendments and remarks, all of the claims now pending in this application are believed to be in condition for allowance. Reconsideration and favorable action are respectfully solicited.

Should the Examiner believe there are any remaining issues that must be resolved before this application can be allowed, it is respectfully requested that the Examiner contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

Mitsuhiro OKUNE et al.

/Jeffrey J. Howell/

By 2010.06.09 13:09:50 -04'00'

Jeffrey J. Howell

Registration No. 46,402

Attorney for Applicants

JJH/ekb

Washington, D.C. 20005-1503

Telephone (202) 721-8200

Facsimile (202) 721-8250

June 9, 2010